

Appendix C: User Manual

Contents:

1. Layout	2
2. Getting Started	4
3. Troubleshooting	8

1. Layout



Figure 1. Blinds Frame Setup (Backside/Indoors)



Figure 2. Blinds Frame Setup (Frontside/Outdoors)

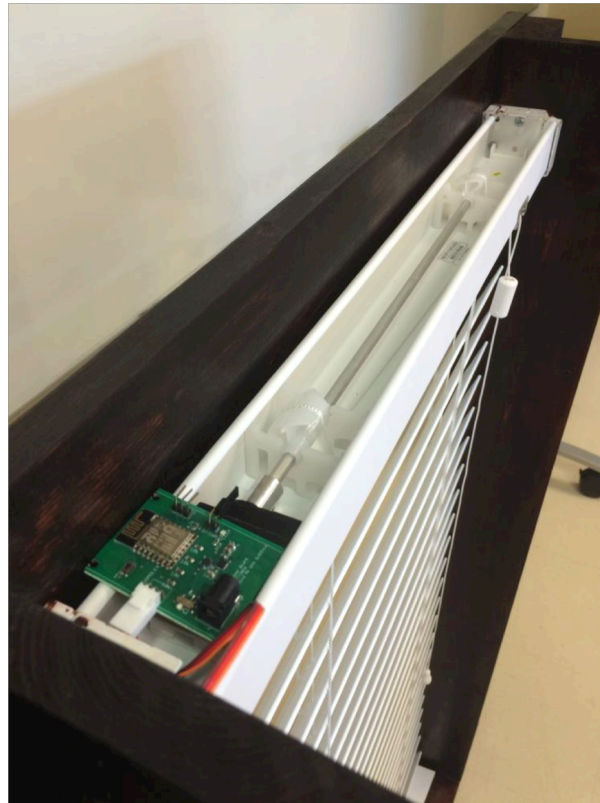


Figure 3. Blinds Frame Setup (Top View w/ Servo and Indoor Board)

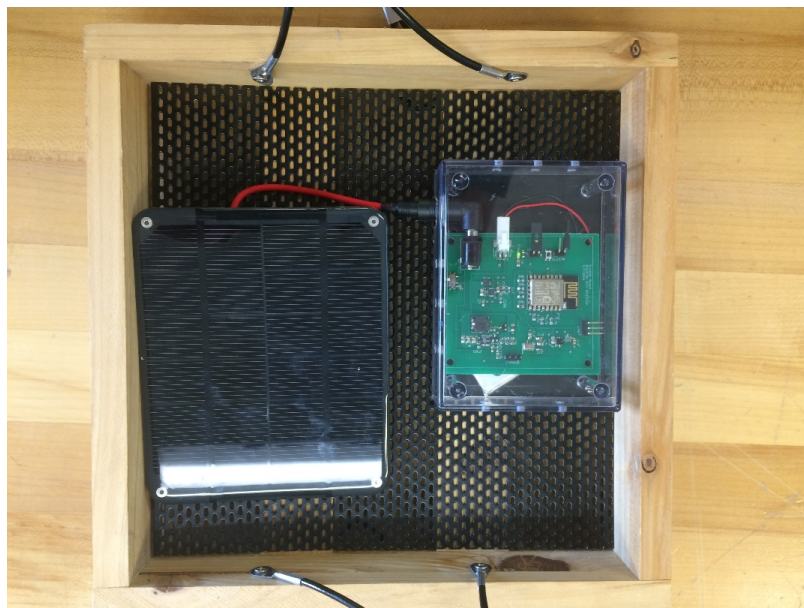


Figure 4. Weather Station w/Solar Charger Panel and Battery

Getting Started

iOS Mobile Application

You can download the mobile app for this project on the Apple App Store. If you are having problems or have questions concerning the code, please contact cgruis@alumni.nd.edu.

Pre-Start Setup

Before turning the system on, make sure all connections for both the indoor and outdoor board are secure (wall-wart plug-in charger, servo-molex connector, solar panel jack, battery-molex connector, etc.). After plugging the indoor board to an outlet, ensure that the shaft and spline combo is properly attached to the servo motor.

Simple Start-up

When you first turn on either the indoor board or outdoor board, you need to program which Wi-Fi network the boards will be communicating over to our server. Go to the Wi-Fi tab under your phone's settings and you will find either the "Weather Station" or "Blinds" access point. Choose the corresponding board you are trying to program and tap the "Configure Wi-Fi" button. You will then be prompted to choose which Wi-Fi network to connect to. After inputting your SSID and password you are ready to go! The board will be permanently programmed to this network unless you choose to change it later.

Mobile Application

Upon startup, you will be presented with the following screen:

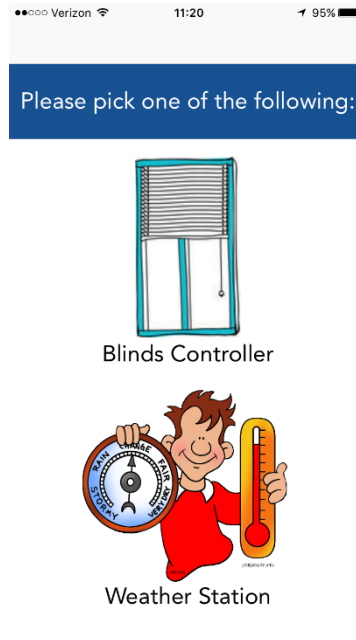


Figure 5. App Startup Screen

If you tap Blinds Controller, the app will segue to the following screen:

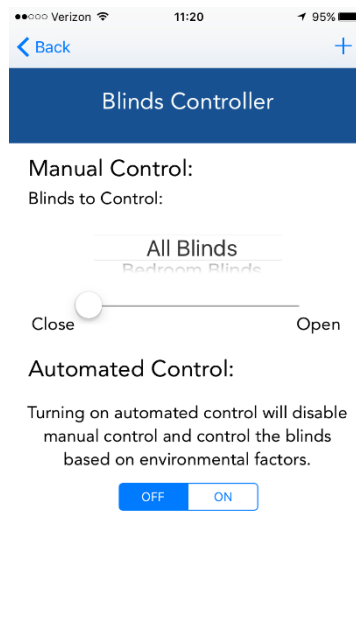


Figure 6. Blinds Controller

The Blinds controller is separated into two controls: manual and automatic. Before controlling your blinds, specify which blinds you want to move by scrolling up and down the list. “All Blinds” will rotate all the blinds you have added to the app. You can then rotate the corresponding blinds by using the slider tool. If you have connected the weather station properly, you can turn on automatic control. This will rotate the blinds based on the light reading from the weather station. There are three blinds positions in automatic control: “closed”, “open”, and “partially open”. Automatic control is best for when you leave the house for work or vacation. If you dislike the current position of the blinds, you can always override the position with the manual controller. To add an additional blinds to your home setup, tap the “+” button at the top right of your screen and you will be presented with the following screen:

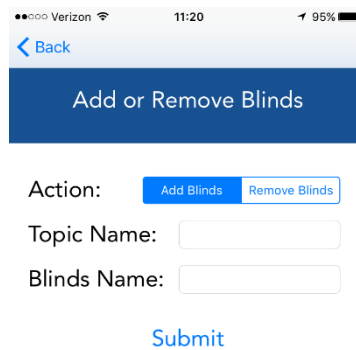


Figure 7. Add or Remove Blinds Screen

In this screen you can either remove an existing set of blinds or add a new set of blinds. You can specify that by choosing the appropriate action. Every new set of blinds you buy will come with a preset Topic Name specific to that blinds. You must type that in the “Topic Name” box. You can then type whatever name you choose for the “Blinds Name”. After submitting, the corresponding blinds will be added or removed in the Blinds Controller Screen.

If you choose Weather Station on the Startup Screen, you will be presented with the following screen:

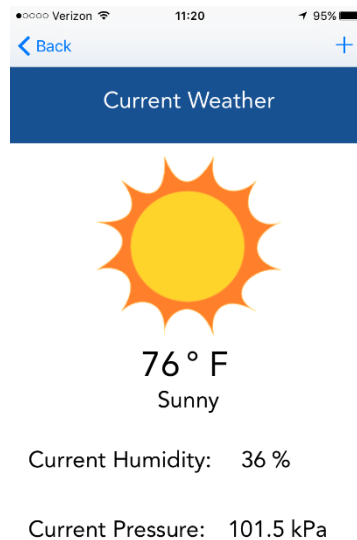


Figure 8. Weather Station Screen

This screen presents the user with a “Weather App”-like view of the current weather. The temperature, humidity, and pressure will constantly update when the weather station wakes up from sleep-mode. The weather graphic will also update based on the state of the current weather. There is also a “+” button at the top which allows you to add another weather station if your current one is broken. The adding/removing feature is similar to the add/remove feature for the blinds.

Charging

Since the indoor board is powered through a regulated 5V wall wart via an outlet, you will not need to worry about that power system. The weather station is powered through a battery. The battery can only be charged with our solar charger circuit and solar panel. For the solar charge to function properly, it must be in decent sunlight. Therefore, place your panel and weather station appropriately, whether it be outside your window, on a bird feeder, etc. The charger needs a minimum of 6V from the panel to charge your battery.

Sleep-Mode

The outdoor board has a built in sleep-mode to limit the amount of power consumption from the microcontroller, sensors, etc. To ensure that the sleep-mode is functioning properly, place a jumper connector over the header pins labeled, “SLEEP”. Sleep-mode is designed to wake up every 30 minutes and gather data from the sensors. Your blinds and weather settings will update correspondingly on the mobile application.

Troubleshooting

Blinds Rotation (Mechanical Issues)

If the board is on and the servo is not rotating, check that the molex connector of the servo is properly connected to the male molex connector on the board. Additionally, before turning on the board and connecting the servo, make sure that the blinds is in the “closed” position when connecting the servo and the hex rod/spline combo.

iOS Mobile Application

If you are having problems with the mobile app, check to make sure that your devices are connected to the correct Wi-Fi network. If the blinds are not rotating properly or the weather station is not updating, check the corresponding boards for connection or power errors. Sometimes, it takes time for the boards to connect to the Wi-Fi network, especially after being in sleep-mode. Therefore, wait a couple of seconds before trying to control the blinds. To refresh the app, double tap the home button of the iPhone, close the app, and restart.

Power/Charging

If the indoor board does not turn on, check the power jack connection to the wall wart. If the red LED is not lit, the board is not on. This would be a systematic error: disconnect the battery from the board and check all other connections.

If the outdoor board does not turn on, check the power jack connection to the solar panel and the molex connection to the battery. Additionally check the voltage level of the solar panel since 6V is required for proper charging. You can also check the battery charge level since 3.3V+ is necessary for the sensors and ESP to function well. If the battery is sufficiently charged, check the control board. If the green LED is not lit, the board is not on. This would be a systematic error: disconnect the battery from the board and check all other connections.